# Gene editing approach aims for broad disease resistance in staple food crops

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Dr. Junqi Song, Texas A&M AgriLife Research plant pathologist in Dallas, believes his team has discovered a system for achieving broad disease resistance in a number of staple food crops. Credit: Texas A&M AgriLife photo by Gabe Saldana

A novel gene editing approach could hold the key to broad-spectrum disease resistance in certain staple food crops without causing physical detriment to the plants, said a Texas A&M AgriLife Research scientist.

Dr. Junqi Song, AgriLife Research plant pathologist in Dallas, explores

how a "knock-in" gene editing approach might achieve better disease resistance in a wide range of crop plants.

His team places special focus on addressing late blight disease in tomato and potato. The Texas grown crops are part of a nearly $6 billion national production value, according to U.S. Department of Agriculture data.

"Most successes with broad-spectrum disease resistance so far have resulted from knockout gene editing, where certain genes are switched off to cause desired behaviors in a subject plant," Song said. "But successes from knockout editing come at a cost to many other aspects of the plant's physical health and other characteristics."

As an alternative to switching genes off, Song's team, using an emerging technology known as the CRISPR/Cas9 system, will introduce, or knock in, a specific set of genetic regulators. He believes the regulators discovered by his team will allow disease resistance to increase without harming the subject plant.

"By comparison, the knock-in approach is a much more complicated process than knockout," Song said.

The introduced systems would work by helping the plant's existing disease resistance genes to express more hardily against attacking pathogens. The wide range of pathogens targeted by Song's broad-resistance approach include phytophthora infestans, which causes late blight, a devastating disease in tomato and potato, he said.

He added any discoveries made through his research would carry disease-resistance implications for a number of food crops including wheat, rice, cotton, strawberry, carrot and citrus.

"There is a growing demand for agricultural production as global populations continue to grow," he said. "We will need to develop increasingly efficient systems to meet this demand and hopefully our work is a step in the right direction."

Provided by Texas A&M University

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